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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,504	12/12/2003	Charles Augustus Choate IV	BUR920020015US2	1005

7590 07/25/2007
IP Law Department, 972E
IBM Corporation
1000 River Street
Essex Junction, VT 05452

EXAMINER

BUEKER, RICHARD R

ART UNIT	PAPER NUMBER
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1763

MAIL DATE	DELIVERY MODE
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07/25/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/734,504	Applicant(s) CHOATE ET AL.	
	Examiner Richard Bueker	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-12, 16 and 33-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-12, 16 and 33-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Claim 35 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The phrase "or the like" in claim 35 renders the scope of the claim unclear and indefinite.

Claims 9-12, 16, 33, 34 and 36-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarraf (5,558,720) taken in view of Galliard (4,606,296). Sarraf (see the Fig., for example) discloses a molecular beam epitaxy (MBE) apparatus for depositing a material on a substrate arranged in a deposition chamber. Sarraf's apparatus includes an MBE source material enclosure 28 which contains a cell 30 comprised of solid material made of a sintered tungsten powder wick having exposed surfaces, and a source material fluid adhered on said exposed surfaces by capillary attraction.

The definition of "capillary attraction" (see attached dictionary definition) is "the force of adhesion between a solid and a liquid in capillarity" (emphasis added). Also, the definition of "adhesion" (see attached dictionary definition) is "the action or state of adhering" (emphasis added). Therefore, the fluid in Sarraf's capillary wick 30 is adhered to the capillary wick and Sarraf's apparatus meets the claim 9 limitation of a "fluid adhered on said exposed surface".

Sarraf does not discuss the location of his MBE cell with respect to the MBE deposition chamber. Galliard (see Figs. 1-3), however, shows that MBE material sources are conventionally located in the MBE deposition chamber. It would have been obvious to locate the source material enclosure 28 and cell 30 of Sarraf in the

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deposition chamber in the manner illustrated by Galliard, because Galliard makes clear that MBE apparatus conventionally include the material source container in the deposition chamber.

Sarraf teaches that his apparatus can be used to deposit gallium, and also many other materials, including aluminum and indium (see col. 4, lines 1-5 and 46-53), and also materials that are liquid at ambient conditions.

Regarding the use of gallium as an impurity in a silicon thin film, the article by Fathauer (J. Appl. Phys. 64 (8)) is cited of interest to show that gallium was known in the prior art as an impurity for incorporation into a silicon thin film. Therefore, the gallium adhered to Sarraf's capillary wick 30 is inherently capable of acting an "impurity". It is noted, however, that none of the presently pending apparatus claims require the presence of a silicon thin film or the presence of any other type of substrate to be treated.

Also, Sarraf teaches that his apparatus is intended for use in forming AlGaAs layers, wherein either of the aluminum or gallium components can be considered to be an "impurity".

Furthermore, the phrase "for incorporating an impurity in a thin film" in the preamble of claim 9 is merely a recitation of intended use that does not so limit the present apparatus claims. Sarraf's apparatus is inherently capable of being used to incorporate an impurity in a thin film. It is noted that whether or not a particular material is to be classified as an "impurity" depends on the intended use of the material.

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Regarding claim 10, Galliard (see col. 1, lines 36-40) teaches that carbon containing compounds can be used as a source material for an MBE process, and it would have been prima facie obvious to use the MBE apparatus of Sarraf to supply a carbon containing source material as suggested by Galliard. It is noted that Sarraf teaches (col. 4, lines 1-5) that source materials that are liquid at ambient conditions can be used in his apparatus, and the source materials of Galliard are of this class of materials.

Regarding claim 39, the container 28 of Sarraf is an enclosure, and the cell 30 is located in the enclosure.

Regarding claim 41, Galliard teaches that an MBE source material container can successfully be supplied with material by means of a connector that includes a valve (see Fig. 3 of Galliard) such as valve 26 or valve 31 provided in the connector. It would have been obvious to one skilled in the art to provide the vapor source of Sarraf with a connector having a valve to ensure a steady and stable material supply as taught by Galliard.

Claims 9-12, 16 and 33-42 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Tom (5,704,965). Tom (see Figs. 3 and 7, for example) discloses an apparatus for incorporating a fluid (gas or liquid – see col. 9, lines 6-21, for example) on a substrate. The substrate is a porous carbon sorbent material in a form such as beads, tablets, extrudates, cloth, web, honeycomb matrix monolith, etc. (see col. 12, lines 48-57, for example). The porous carbon is a cell as recited in claim 9, or alternatively each pore in the porous carbon is a

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cell. Tom's apparatus comprises a cell comprising a substantially solid material (the above described carbon sorbent material) having exposed surfaces located entirely within a deposition chamber (the gas cylinder described from col. 12, line 58 to col. 13, line 24, and gas cylinder 102 illustrated in Fig. 7, for example). An impurity (gas or liquid) such as germane is adhered to said exposed surfaces as recited in claim 9. It is noted that germane is a germanium containing fluid. Also, germanium is an impurity that is claimed in claim 10, and therefore the germane fluid of Tom is inherently "an impurity containing fluid adhered to said exposed surfaces" as recited in claim 9. Tom describes the fill process of his apparatus at col. 17, line 28 to col. 18, line 6. The fill process is a process of incorporating an impurity (e.g. the germanium in germane) in a thin film on the carbon sorbent substrate contained in the deposition chamber ((e.g. cylinder 102) as recited in the preamble of claim 9. Regarding the particular solid materials recited in claim 38, Tom makes clear (see Fig. 1 of Tom, for example) that ceramics such as zeolite were also well known in the prior art as sorbent materials for absorbing fluids as a thin film on the ceramic sorbent material.

Claims 9-12, 16 and 33-38 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Wang (6,453,924). In the paragraph bridging cols. 2 and 3, Wang incorporates the disclosure of Tom (5,704,965) and other related references. Therefore, all of the disclosure of Tom is included in Wang. Wang discloses an apparatus for supplying a dopant or impurity species (see col. 9, lines 33-41 of Wang) into a semiconductor thin film on a substrate. In the Fig. of Wang, the clean room represented by wall 22 is a chamber in which semiconductor

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processes such as deposition are performed, and therefore the clean room can properly be described as a deposition chamber. Impurity cells are located within the deposition chamber delineated by wall 22. The cells comprise the substantially solid sorbent material having exposed surfaces located entirely within the deposition chamber, and an impurity-containing fluid (such as germanium containing germane) adhered on said exposed surfaces. Also, regarding the limitations of claims 39-42, each impurity cell of Wang is contained within an enclosure in the form of local supply vessel 50 or local supply vessel 96, with an impurity source in the form of main liquid supply vessel 12 coupled to the enclosure (50 or 96) by a connector 18 which includes a valve.

Applicants have argued that the prior art references do not include an impurity-containing fluid adhered on the exposed surfaces. It is noted, however, that the definition of "capillary attraction" (see attached dictionary definition) is "the force of adhesion between a solid and a liquid in capillarity" (emphasis added). Also, the definition of "adhesion" (see attached dictionary definition) is "the action or state of adhering" (emphasis added). Therefore, the fluid in Sarraf's capillary wick 30 is adhered to the capillary wick and Sarraf's apparatus meets the claim 9 limitation of a "fluid adhered on said exposed surface".

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Bueker whose telephone number is (571) 272-1431. The examiner can normally be reached on 9 AM - 5:30 PM, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Richard Bueker
Primary Examiner
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